

## ATMOSPHERIC ELECTRICITY.

## AURORAS.

Fort Bridger, Wyoming, 5th: an aurora was visible during the first half of the night. It appeared in the northeast in the form of an arch covering 40° of the horizon and extending upward 30°.

Mount Washington, New Hampshire, 8th: at 7.12 p. m., after the disappearance of a fog, a faint aurora became visible and continued until 10.12 p. m., when the display was obscured by clouds. The auroral light extended over 80° of the northern horizon and to an altitude of 10°.

Eastport, Maine, 8th: an auroral arch of whitish color and of about 30° altitude was observed from 7 p. m. to 3 a. m. of the 9th. Thatcher's Island, Massachusetts, 8th: auroral bands of yellowish color, having a waving motion, were observed from 8 to 10 p. m.

Portland, Maine, 8th: an aurora, in the form of a band of diffuse light, was observed from 10.30 p. m. until midnight.

Escanaba, Michigan, 8th: an auroral arch of bright yellow color and resting upon a dark segment was observed at 6.35 p. m. At 11.15 p. m. bright beams rose slowly from the centre to the eastern extremity of the arch and extended to within 45° of the zenith. The display continued until the early morning of the 9th. A faint display also occurred on the 17th from 9.35 to 10.20 p. m.

Fort Totten, Dakota, 8th: an aurora was visible from 6.10 to 10.50 p. m.; there were three arches, one above the other, at altitudes of 15°, 25° and 35°, respectively, the central arch being well defined, while the others were indistinct. Displays were also observed on the 17th and 22d; that on the 17th, resembling the one above described.

Fort Buford, Dakota, 8th: an aurora, in the form of an arch of whitish color, was observed from 9 p. m. until midnight; the arch extended from northeast to northwest, and to an altitude of 35°. On the 17th, a display, consisting of a poorly defined arch of 30° altitude, was observed from 9 to 11.30 p. m.

Moorhead, Minnesota, 9th: an aurora was visible in the north from 11 p. m. until midnight.

Saint Vincent, Minnesota, 17th: an aurora was observed from 8.40 to 11 p. m.; when first seen it consisted only of a diffused light; at 9.15 an arch was formed extending over 50° of the horizon and to an altitude of 25°; indistinct streamers extended upward from the arch, beneath which was a clearly-defined dark segment. A faint auroral light was observed in the north from 6.30 a. m. until daylight on the 23d; no arch was visible.

The following stations report auroras, the observers giving the dates only:

4th.—Le Roy, New York.

8th.—Cresco and Humboldt, Iowa; Salina, Kansas; Cornish and Gardiner, Maine; Amherst, Cambridge, and Rowe, Massachusetts; Manistique and Swartz Creek, Michigan; Northfield, Minnesota; Yutan, Nebraska; Burlington, Vermont; Embarras, Madison, Wausau, and Manitowoc, Wisconsin.

14th.—Tiffin and Hiram, Ohio.

15th.—Ann Arbor, Michigan.

17th.—Sussex, Wisconsin.

31st.—Hiram, Ohio.

## THUNDER-STORMS.

Thunder-storms occurred in several states and territories during January, as follows:

Alabama.—Montgomery, 11th, 16th; Birmingham, 11th, 27th; Greensboro, 5th, 11th, 27th.

Connecticut.—New Haven, 16th.

Florida.—Cedar Keys, 6th, 16th; Sanford, 16th; Key West, 30th, 31st; Pensacola, 12th, 16th; Archer, 6th, 16th; Tallahassee, 11th, 16th.

Georgia.—Atlanta, 11th, 16th, 27th, 28th; Savannah, 6th, 12th, Augusta, 16th.

Illinois.—Cairo, 5th, 11th; Anna and Swanwick, 11th.

Indiana.—Indianapolis, Laconia, Vevay, Jeffersonville, Sunman and Spiceland, 11th.

Kentucky.—Louisville, 22d; Frankfort, 11th; Richmond, 11th, 15th, 16th.

Louisiana.—New Orleans, 5th, 6th, 16th, 24th; Shreveport, 14th, 15th; Liberty Hill, 5th, 15th; Grand Coteau, 4th, 16th, 31st; Point Pleasant, 5th, 11th, 15th, 30th.

Maine.—Bangor, 16th.

Mississippi.—Vicksburg, 5th, 11th, 16th.

New Jersey.—Moorestown, 12th.

New Mexico.—Santa Fé, 9th.

North Carolina.—Charlotte, 12th; Wilmington and New River Inlet, 28th; Smithville, 12th, 17th; Fort Macon, 6th, 11th, 12th, 28th; Kitty Hawk, 6th, 12th; Hatteras, 6th; Wash Woods, 5th.

Ohio.—Cincinnati and College Hill, 11th; Portsmouth, 12th.

Rhode Island.—Point Judith, 9th, 12th; Block Island, 28th.

South Carolina.—Charleston, 12th; Stateburg, 6th, 12th; Pacolet, 6th, 11th.

Tennessee.—Memphis, 5th, 11th; Nashville, 6th, 11th, 12th, 15th, 16th; Chattanooga and Ashwood, 11th; Milan, 4th, 11th, 15th, 27th; Austin, 12th, 16th.

Texas.—Galveston, 4th, 5th; Indianola, 3d, 4th, 15th; Palestine, 14th, 30th; Brownsville, 13th; Fort Davis, 15th; Fort Brown, 14th; Austin, 3d, 29th; Cleburne, 30th.

Virginia.—Cape Henry, 12th, Norfolk and Johnstown, 28th.

## ELECTRICAL PHENOMENA.

Fort Assinaboine, Montana, 26th: from 7 to 9 p. m. the air was so charged with electricity as to interfere with telegraphic communication.

## OPTICAL PHENOMENA.

## SOLAR HALOS.

Solar halos were observed in the various states and territories as follows:

Arizona.—27th.

California.—3d, 4th, 8th, 11th, 15th, 16th, 17th, 21st, 26th, 27th, 31st.

Colorado.—2d, 5th, 20th, 30th.

Connecticut.—5th, 11th, 27th, 31st.

Dakota.—2d, 17th, 18th, 20th, 21st, 22d, 31st.

Florida.—2d, 17th, 18th, 22d.

Georgia.—22d, 29th, 30th.

Illinois.—10th, 17th, 18th.

Indiana.—17th, 18th, 19th, 27th.

Iowa.—1st, 12th, 13th, 17th, 18th, 20th, 21st.

Kansas.—1st, 2d, 18th, 21st.

Louisiana.—28th.

Maine.—9th, 14th.

Massachusetts.—2d, 11th, 27th.

Michigan.—1st, 4th, 5th, 8th, 10th, 14th, 17th, 18th, 19th, 22d, 25th.

Minnesota.—2d, 3d, 11th, 18th, 20th, 21st, 26th.

Nebraska.—21st, 27th.

New Hampshire.—9th, 14th.

New York.—4th, 8th, 10th, 14th, 17th, 19th, 20th, 23d.

North Carolina.—7th, 8th, 12th, 13th, 21st, 26th, 28th, 29th.

Ohio.—3d, 10th, 14th, 19th, 21st, 25th, 26th, 28th, 29th.

Oregon.—18th, 19th.

South Carolina.—17th, 18th, 29th, 30th.

Tennessee.—10th, 13th, 20th, 27th.

Texas.—17th, 25th, 29th.

Utah.—1st, 8th, 9th.

Vermont.—21st.

Virginia.—3d, 9th, 14th, 18th, 19th, 21st, 27th, 31st.

Washington Territory.—20th.

Wisconsin.—22d.

Wyoming.—9th, 13th, 22d, 23d, 28th, 31st.

## LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:

Alabama.—28th.